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**Assignment Title: Element 2b Instrument
Essay**

Hacking Week Instrument Essay

HACKER CULTURE

Hacker culture in three words: “We borrow and learn and share knowledge” “Helen Leigh”
A hacker or hacking is taking a piece of technology and making it or using it to do something it wasn’t design to do.

“Being called a hacker wasn’t originally meant to be defamatory and hackers weren’t seen as evil. They thought differently about the systems that made up their world and had an insatiable appetite for taking them apart and making them work slightly differently than intended.”

(A Brief History of Hacker Culture, 2020)

In today's world the term has started to come back again to from its original, broader meaning: “life hacks” has become a popular phrase for small, clever tricks for dealing with day-to-day issues that may not have anything to do with computers and aren't illegal in any way.

In simple terms hacker culture is a group of people working together to better the world creativity with the use of technology while putting a smile on the people's faces.

“Hackers have always had ethics, and a code of sort. Creativity, sharing information freely, looking past superficial and meaningless criteria to get at the heart of meaning, and learning through exploration have always been valued highly in the hacking community. There are also more traditional codes of conduct, if unstated; at MIT, for example, it’s considered a matter of pride and perfection that hacks do not cause lasting damage and can be undone easily. Some hackers even leave detailed instructions for the authorities to undo their own work.”

(A Brief History of Hacker Culture, 2020)

A Brief History of Hacker Culture

Hacker Culture can be traced back to the mid 1950's,
“MIT, the Massachusetts Institute of Technology, is widely considered the birthplace and ancestral home of hacking. The modern use of the term is thought to have originated there in the mid-1950s.”

(A Brief History of Hacker Culture, 2020)

Hacker culture has its roots in MIT, within a group engineering student called the “Tech Model Rail Road” or TMRC Members would gather to obsess over putting together model trains and tracks using a wide array of electronic components. Just for pure joy of building things.

When the first computers were made accessible to the students of MIT, the TMRC's members started becoming interested in experimenting with them and seeing how they

worked. This in turn led to the development of the first ever computer games, to the early research work on artificial intelligence and to development of first ever programming languages.

Today's culture is made up of the kind of people who have a great interest for constantly learning and improving their knowledge on how to build new things and who enjoy feeding their curiosity. It is important to note these are not necessarily people who know a lot about computer programming or who develop software or hardware, but rather the type of person who see the world differently and want to bring that vision to reality.

It's important to also note that Hackers rarely work individually Hackers are usually into to forming communities with other people who share their interests and passions. These communities work as a platform for sharing knowledge, tools and ideas, there generating a flow of new projects and initiatives to be carried out as a group, where the pleasure and love for building and creating is shared among all.

The Tools of a Hacker

Include the obvious use of Websites ,coding , technology but the most important tool to a hacker is the community they are emerged in and the sharing and application knowledge with in the community.

"For every task you wish to accomplish, there are tools and knowledge out there that others who have already walked the path have created. Knowing how to use these existing tools will allow you to get work done with greater agility and speed. There's also always the option of joining a community or of creating a new one so that you can tap into the collective knowledge and motivation that comes from a group of people with similar interests." (The Ten Commandments of Hacker Culture, 2020)

The Ten Hacker commandments are the essence of the hacker culture

It can be difficult to sum up the definition of hacker culture in one sentence which is why I chose to include the ten Hacker commandments or ten hacker principles that are considered the back bone of the culture. You can see them listed below

"1. Give before you get.

Always share your work before you expect any kind of recognition

2. Don't ask for permission.

Just do it and worry about the implications afterward as always evaluate

3. Doing > Talking

The problem with just talking is that it doesn't lead to any concrete results, whereas doing does take us to the creation of new things, projects, solutions

4. No excuses.

The culprit is always and inevitably, me.

5. Solve problems.

A good hacker always uses his or her creativity and cleverness for solving problems in new and interesting ways.

6. Follow your curiosity.

Within you lives a ferocious hunger of learning and knowing more about certain arts and topics. Always allow yourself to follow that curiosity, wherever it may lead you

6.2 Failing == Growing.

The biggest growth and lessons almost always come from beating obstacles and adversity

7. Know your tools / communities.

For every task you wish to accomplish, there are tools and knowledge out there that others who have already walked the path have created. Knowing how to use these existing tools will allow you to get work done with greater agility and speed.

8. Always be learning.

If there is one thing that sets hackers apart, it is that they are always learning new things.

9. Get involved.

the world as we know it has many things that are currently wrong with it and that are in urgent need of hands and brains to address them.

10. Have fun.

As with the hacker pioneers at MIT's TMRC, nothing makes any sense if we do not have fun and enjoy ourselves in the process.

"(The Ten Commandments of Hacker Culture, 2020)

Hacker culture is more than just software and programming. you will observe that these are the ten hacker commandments are not only technology principles but also human principles. Any person can adopt hacker culture in their life

Everything that is included in the 10 commandments is to show that hacker culture is a way of living, thinking, acting and the way you see the world. Hackers believe that taking these commandments into consideration and putting them into action can lead to creating better individual as well as better societies.

“Rather than producing technology geniuses or people who know it all, hacker culture seeks to produce better people who will generate positive impact through their actions in a world that so desperately needs it” (The Ten Commandments of Hacker Culture, 2020)

My Instrument the Mighty Mike

One Line Concept : “ Music in the Palm of your Hand”

My product or instrument is called the “Might Mike “ and is designed to allow for easy control and manipulation of a Digital Audio Workstation (DAW) wirelessly and to send and receive midi data to trigger different parameters.

The Tech Breakdown :

BBC Micro Controller x 2
USB Cables
Micro Controller Battery Pack
2x AAA Batteries

Coding website : Make Code <https://makecode.microbit.org/#>

I chose to use the Micro Bit controller because of the it offers a great number of Sensors and inputs available to use including :The midi in capabilities, The ease of use , The fact you can use block coding and java script which for a total novice like myself made understanding coding very easy to do combined with the amount of help available via the Make code website and “instructables” website and from the hacker community made it easier to achieve what I set out to do.

I also chose the Micro Bit because of the tech included on the chip which features a motion sensors, accelerometers and a 3-axis magnetic field as well gesture detection including logo up or logo down , left , right , shake or free falling. I believe that the specifications of the micro bit motion sensors are more than capable of the tasks I wish to the micro bit for.

“The 1.5 micro: bit variant has a combined accelerometer and magnetometer chip that provides 3-axis sensing and magnetic field strength sensing. It also includes some on board gesture detection (such as fall detection) in hardware, and additional gesture sensing (e.g. logo-up, logo-down, shake) via software algorithms.”

Technical information for the motion sensors is as follows:

“The v1.5 micro:bit has a footprint for two different motion sensors: one made by ST (the LSM303AGR) and one by NXP (FXOS8700CQ). The micro:bit DAL supports both of these sensors, detecting them at runtime. To date, all v1.5 boards have been manufactured with the LSM303AGR. (Hardware, 2020)

Technical information continued:

item	details
Model	LSM303GR
Features	3 magnetic field and 3 acceleration axis , 2/4/8/16g ranges
Resolution	8/10/12 bits
On board gestures	‘freefall’
Other gestures	Other gestures are implemented by software algorithms in the runtime.

(Hardware, 2020)

Other boards I could of used include the “Makey Makey” board but I felt the board was a bit out of my price range and would be to complex for people to self programme at home.

The Execution

I wanted to create a wireless midi controller to make recording and triggering different parameters it easier for guitarists and musician’s to record their music as well as making different FX playable in a live performance.

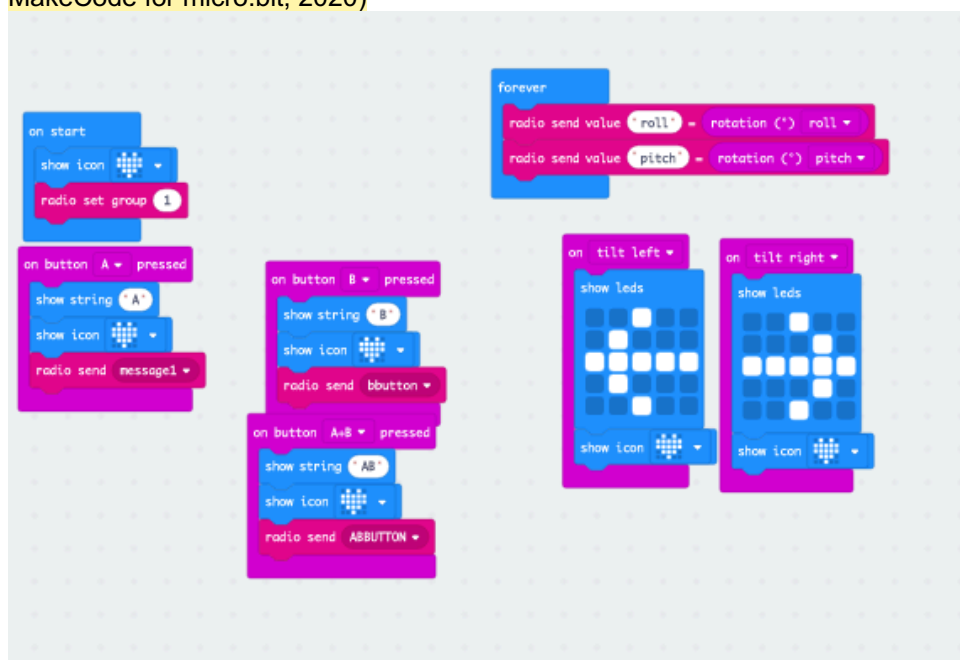
The Mighty Mike product consists of two micro bit controllers working as a radio pair, one as a sender and one as a receiver. The Receiver connects to computer via USB and by using the software known as: “Hairless Midi Serial” as a midi converter it allows the micro bits to communicate with the computer and any midi capable programs such as Logic Pro X.

The Execution of The Sender Micro Bit:

The sender micro bit is the micro bit that is attached to the glove and will be the glove capturing all the data from the user. I have coded the sender micro bit to pick up the following data from the sensors, the location of the micro bit with in a 3 angle axis , if it is being tilted left or right , if button a is pressed , if button B is pressed or if both are pressed together.

Using a combination of gesture movements and button pressing you are able to control different parameters within Logic X whether it be to trigger midi controlled affect such as stutter edit or to control pitch change or a EQ filter Sweep. You can assign Logic X to Learn the different gestures as they are using midi data which Logic X uses to control most if not all of its parameters.

Here is the block code and Java Script for the Sender Micro Bit :
(MakeCode for micro:bit, 2020)



```

1  enum RadioMessage {
2      message1,
3      bbutton,
4      ABBUTTON
5  }
6  input.onButtonPressed(Button.A, function () {
7      basic.showString("A")
8      basic.showIcon(IconNames.Heart)
9      radio.sendMessage(RadioMessage.message1)
10 })
11 input.onGesture(Gesture.TiltLeft, function () {
12     basic.showLeds(`
13         . . # . .
14         . # . . .
15         # # # # #
16         . # . . .
17         . . # . .
18     `)
19     basic.showIcon(IconNames.Heart)
20 })
21 input.onButtonPressed(Button.B, function () {
22     basic.showString("B")
23     basic.showIcon(IconNames.Heart)
24     radio.sendMessage(RadioMessage.bbutton)
25 })
26 input.onGesture(Gesture.TiltRight, function () {
27     basic.showLeds(`
28         . . # . .
29         . . . # .
30         # # # # #
31         #

```

(Microsoft MakeCode for micro:bit, 2020)

```

18     `)
19     basic.showIcon(IconNames.Heart)
20 })
21 input.onButtonPressed(Button.B, function () {
22     basic.showString("B")
23     basic.showIcon(IconNames.Heart)
24     radio.sendMessage(RadioMessage.bbutton)
25 })
26 input.onGesture(Gesture.TiltRight, function () {
27     basic.showLeds(`
28         . . # . .
29         . . . # .
30         # # # # #
31         . . . # .
32         . . # . .
33     `)
34     basic.showIcon(IconNames.Heart)
35 })
36 input.onButtonPressed(Button.AB, function () {
37     basic.showString("AB")
38     basic.showIcon(IconNames.Heart)
39     radio.sendMessage(RadioMessage.ABBUTTON)
40 })
41 basic.showIcon(IconNames.Heart)
42 radio.setGroup(1)
43 basic.forever(function () {
44     radio.sendValue("roll", input.rotation(Rotation.Roll))
45     radio.sendValue("pitch", input.rotation(Rotation.Pitch))
46 })
47

```

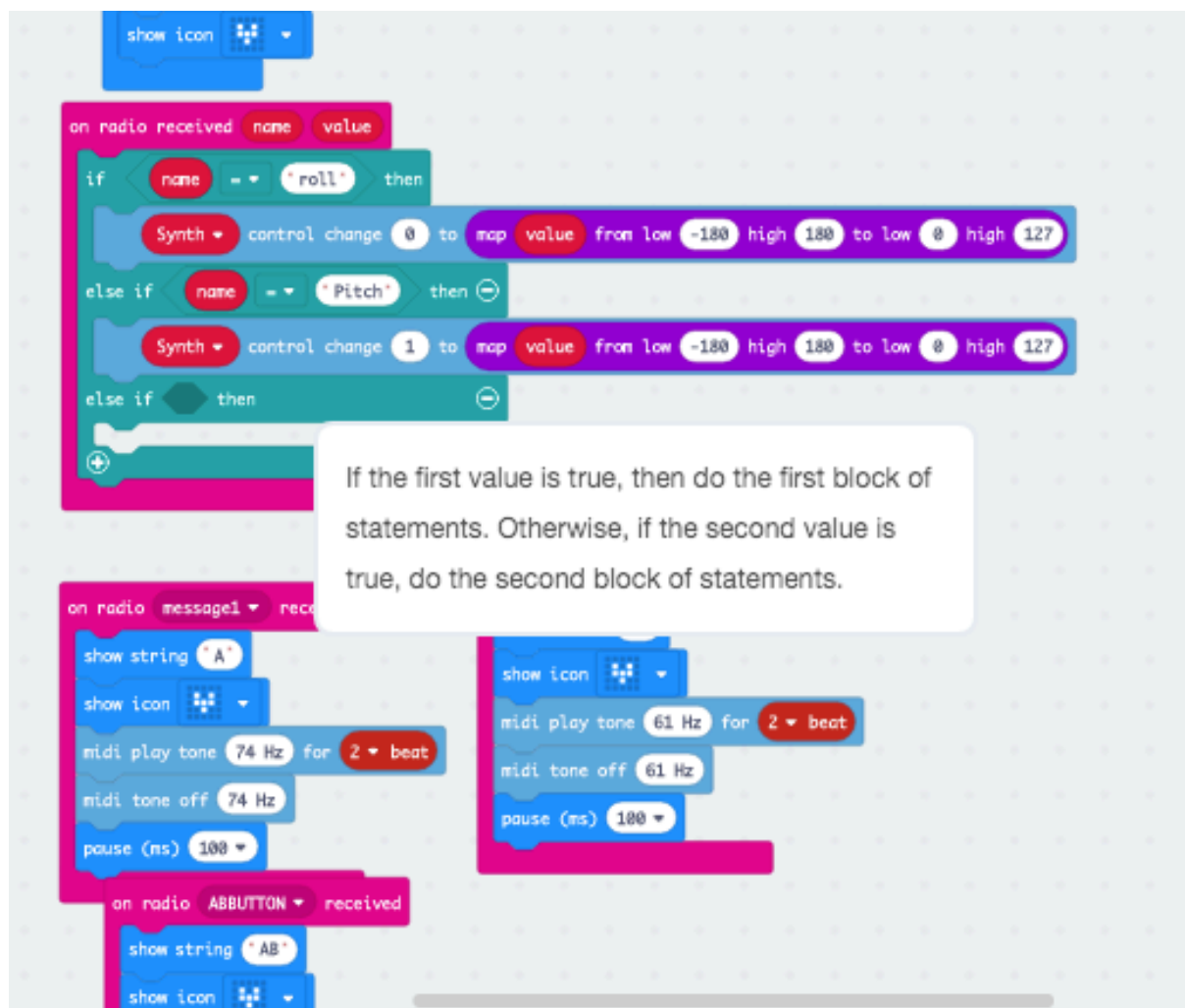
(Microsoft MakeCode for micro:bit, 2020)

The Execution of The Receiver Micro Bit:

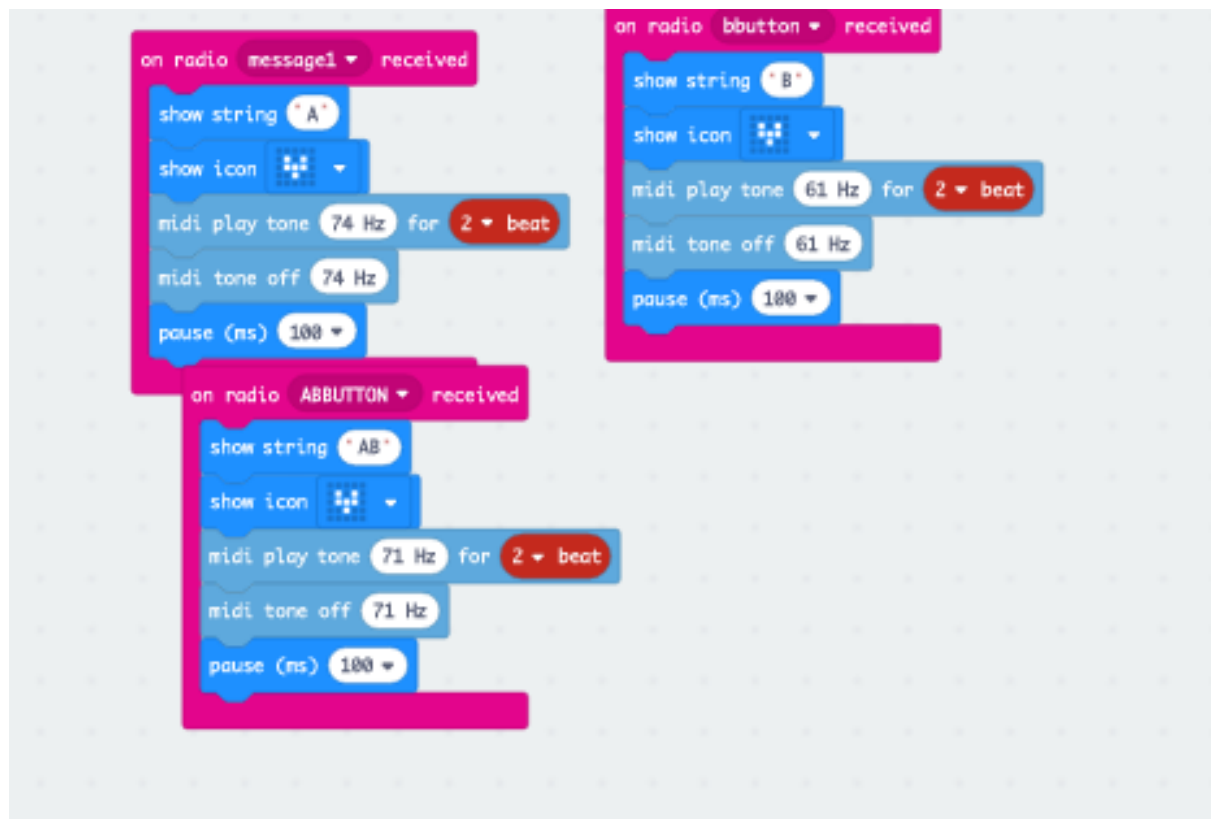
The receiver micro bit captures all the information from the micro bit sender or capture device including : the accelerometer sensor , monition sensor and any buttons pressed and coverts it into midi data via the software Hairless Midi Serial which in tern allows for the laptop and DAW to read the midi data being sent from the Mirco Bits.

The most important part of the coding is that you have to use "midi Raw Serial " which is how the chip converts and understands the midi data being sent from the sender chip. This allows for wireless connect which is essential to compete in todays into days market.

Here is the block code and Java Script for the Receiver Micro Bit:



(Microsoft MakeCode for micro:bit, 2020)



(Microsoft MakeCode for micro:bit, 2020)

```

enum RadioMessage {
  message1,
  bbutton,
  ABBUTTON
}

radio.onReceivedValue(function (name, value) {
  if (name == "roll") {
    Synth.controlChange(0, Math.map(value, -180, 180, 0, 127))
  } else if (name == "Pitch") {
    Synth.controlChange(1, Math.map(value, -180, 180, 0, 127))
  } else if (false) {

  }
})

radio.onReceivedMessage(RadioMessage.bbutton, function () {
  basic.showString("B")
  basic.showIcon(IconNames.SmallHeart)
  midi.playTone(61, music.beat(BeatFraction.Double))
  midi.toneOff(61)
  basic.pause(100)
})

radio.onReceivedMessage(RadioMessage.message1, function () {
  basic.showString("A")
  basic.showIcon(IconNames.SmallHeart)
  midi.playTone(74, music.beat(BeatFraction.Double))
  midi.toneOff(74)
  basic.pause(100)
})

radio.onReceivedMessage(RadioMessage.ABBUTTON, function () {
  basic.showString("AB")
  basic.showIcon(IconNames.SmallHeart)

```

(Microsoft MakeCode for micro:bit, 2020)

```

radio.onReceivedMessage(RadioMessage.bbutton, function () {
  basic.showString("B")
  basic.showIcon(IconNames.SmallHeart)
  midi.playTone(61, music.beat(BeatFraction.Double))
  midi.toneOff(61)
  basic.pause(100)
})
radio.onReceivedMessage(RadioMessage.message1, function () {
  basic.showString("A")
  basic.showIcon(IconNames.SmallHeart)
  midi.playTone(74, music.beat(BeatFraction.Double))
  midi.toneOff(74)
  basic.pause(100)
})
radio.onReceivedMessage(RadioMessage.ABBUTTON, function () {
  basic.showString("AB")
  basic.showIcon(IconNames.SmallHeart)
  midi.playTone(71, music.beat(BeatFraction.Double))
  midi.toneOff(71)
  basic.pause(100)
})
let Synth: midi.MidiController = null
basic.showIcon(IconNames.SmallHeart)
radio.setGroup(1)
Synth = midi.channel(1)
midi.useRawSerial()
basic.forever(function () {
  basic.showIcon(IconNames.SmallHeart)
})

```

(Microsoft MakeCode for micro:bit, 2020)

My approach to creating the instrument.

My influences:

My influences are mainly taken from Imogen Heap's MiMu Gloves and from what a student who did the Hacking week course last created and was able to control the pitch of her voice by using a micro bit controller.

Why did I Create this instrument in particular?

I wanted to create a glove that works with Logic Pro X as well as the MiMu and Tornado A1 glove work with in Ableton and that users could customise themselves at home for their own needs whatever they maybe.

My Research:

For my research I chose to look at the top two best-selling midi controller gloves on the market which are the Global DJ Tornado A1 Glove a glove used in the DJ scene to control aspects of Ableton Live as well as visuals and Of course the MiMu Glove from Imogen Heap the pioneer of midi glove technology. First let's start with the Tornado A1:"



The Tornado A1 Glove: Gestures are captured by 3D-sensors: Accelerometer, Gyroscope, Compass. Due to such selection of sensors you get 9D degrees of freedom.

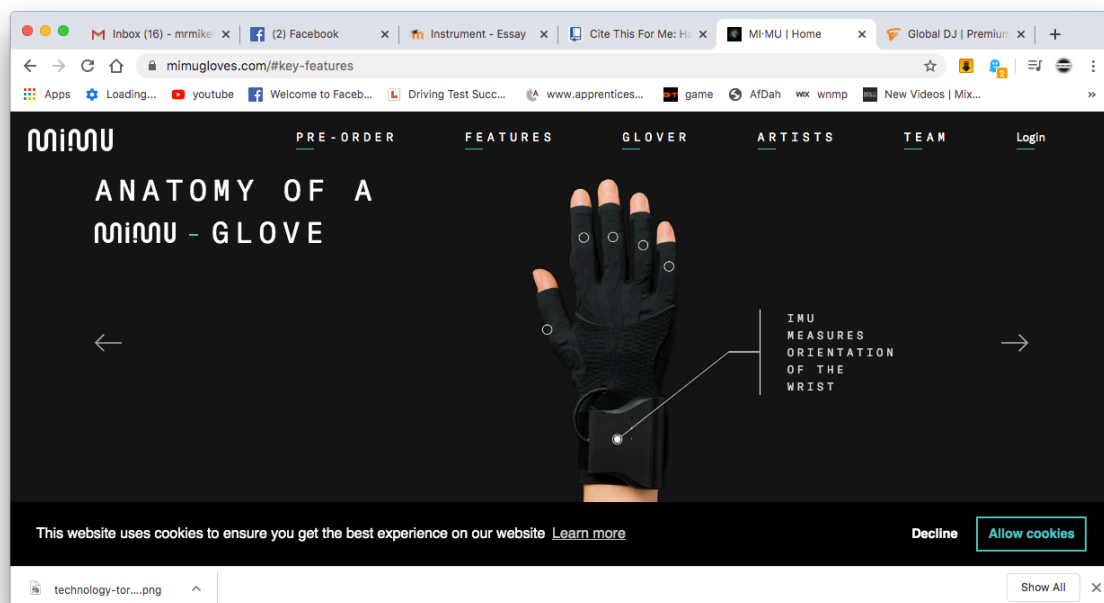
The following is captured:

- Orientation
- Tilts, turns
- Oscillations, waggles
- Beats, sharp movements
- Angular motions and speed
- Acceleration and other motion characteristics

3D-sensors are made on both gloves, that's why you will be able to create several musical effects simultaneously or to control several parameters of one effect using two hands.”
(Global DJ | Premium Midi Gloves Controllers, 2020)

The Tornado A1 captures the same information I wished to capture with glove mainly the orientation , tilts and turns and acceleration and works over other radio waves like I wanted my gloves as it is far more stable than WIFI and I really like the leather look.

Imogen Heap MiMu Gloves



The MiMu gloves measure the orientation of the wrist, communicate over Wi-Fi, combines LED's and Buttons , fingerless and palm free for use with stage performances , vibration motor for haptic feedback , flex sensors to measure the bend of the fingers.

I feel that both the Tornado A1 and MiMu gloves are a great instrument the A1 being more of a root I wish to take as it is more similar to the glove I wish to create. But still taking several elements from MiMu Gloves and incorporating them into my own creation such as the fingerless and palm less glove for use on the stage. But both gloves also showed me

what I didn't want to include in my gloves such as vibration sensors and the ability to control visuals.

I choose to combine the two gloves to make a glove at any one can use and edit home with any given DAW that uses midi with the main focus being on Logic Pro X and a glove that can function in the studio as well as on stage.

An overview of the principles behind how your instrument works.

The product consists of two micro bit controllers working as a radio pair, one as a sender and one as a receiver.

The Sender sends all the information from the micro bit sensors including: the accelerometer sensor, monition sensor and any buttons pressed.

Details of issues you encountered while creating the instrument, and how you overcame or/and adapted to these issues.

The first issue I can across was that the micro bit chips are very basic and do not allow for many multi-function capabilities,

For example, both chips slowed down and stopped transmitting and began to cause latency problems when I added a command line to change the LED output to read what was happening e.g.: being turned left or turned right would illuminate the LED with a left or right arrow.

I overcame this issue by first trying to rewrite the code and change the order the command lines were sent in. To see if that would change the speed in the chips, I then changed the code. So that only the receiving chip would light up when the sending chip was moved but the latency issue still occurred. The last option I tried was removing the wireless function and having all the data be sent over a USB cable. Although this resolved the issue of latency it created further issues including , freedom of movability when controlling different aspects of the DAW, as well as no longer being able to use the chips wirelessly distant from the laptop which would affect its place the consumer market greatly as competitors would have a superior product.

After deciding that wireless was the right way to move forward I chose to remove the LED code as I believe usability and functionality are more important than how the products looks aesthetically.

Reflection upon the results of your instrument.

I am really happy with the results of my instruments and glove it was relativity easy to code with help from the online hacker culture known as "instructables" and to get the glove working within Logic Pro X. I have had much success in manipulating many of Logic's features with my gloves.

Discussion of improvements that could be made to your instrument, and how these could be applied.

I would improve upon my instrument by possibly using a more powerful micro controller as I found that adding too much into the micro bit will cause latency issues with the chip sending and receiving data.

I would choose a better glove design and make the glove more fashion friendly as I am by no means a fashion designer.

I would also like to make use of the sound out put on the chip and the light sensor on the chip to control parameters like pitch and tone.

Comparison and contrast of your instrument to existing commercial instruments.

Compared to the MiMu gloves and the Tornado A1 my glove is rather basic only being able to control six different parameters within a given DAW. But it is based on the same technology and same idea like the A1 and MiMu my glove controls the DAW via its orientation, turn and tilt as well as communicating over radio waves. But my glove is a lot less powerful and doesn't look as nice But like the MiMu and A1 it can be used to make amazing music.

User feedback and beta testing of your instrument, and details on how you responded to this.

My Beta testing had to adjust code to stop latency issues within Logic Pro and change the order of the code to stop this by removing the LED code from the forever loop and moving it to the button pressed command. I had two of my musician friends one was a guitarist interested in remote recording and the other a Beta test the glove for and their feedback was

Guitarist:

They found it very easy to set up with Logic, Great for hands free recording when playing guitar.

The battery pack needs to be smaller as it is too bulky when gesturing, which I went out online and found a smaller battery pack for the micro bit which is more compact and light weight.

A different material for the gloves I am currently in talks with a designers to make a fabric glove or light leather glove.

DJ:

Great to use and easy to set up in Logic Pro X and Ableton, buttons where great for triggering samples or kick drums or midi-controlled FX, Gave a unique look on stage when using the gloves tilt function to make filter sweeps.

The glove needs to be made from different material , I am currently in talks with a designers to make a fabric glove or light leather glove.

Evaluate and apply Sound design, synthesis, sampling and sonic manipulation techniques and traits

With my glove I can control several parameters with in Logic Pro X and trigger different midi notes which I can assign from Logic Pro X.

The track I created is using samples from the first day of the Hacking Course where we went and recorded our own samples using contact microphones. I then loaded these samples into Logic's Alchemy sampler and Ultra Beat to create a full drum kit sound and a basic Saw Tooth Synth sound.

I have used my controller to control an EQ filter sweep, to trigger a kick drum sample and to trigger a midi effect known as stutter edit. Which I set up using the midi learn function. I choose these parameters as the Filter sweep can be controlled by tilting and turning the micro bit just like a real button , a kick drum is triggered by a button on the controller as the same for stutter edit which is controlled by two different buttons on the controller to give to different affects or when both pressed together the coding will chose a random midi note within a specific region to play. As I dance music producer these are some of the most important aspect I need to control and would look great in a live performance.

Manipulate graphical programming environments for sound design (e.g. Max for Live)

With my product you can control all elements within logic as you can assign the DAW to the micro bit controller, including plugin parameters such as filters, EQ and automation. My product can be completely customisable to the customers' needs with in a DAW as most Daws have a "midi Assign "function where you change a parameter within the DAW with midi controller and the DAW remembers the function you have created. For example, using the turning the micro bit from left to right will turn up and down a filter or volume.

Or using the micro bit buttons to trigger midi notes to trigger midi effects such as stutter edit. All of these functions can be combined and used at the same time once you have told the assigned your chosen parameters with in your DAW to the different controls of the micro bit. My Microbit can currently control up to six different at any one time.

How does it look?



This is the micro bit fresh out the box, as you can see it has five pin holes along the bottom which can be used for such things as power and sound input and output. You can also see the different sensors, reset button, Bluetooth chip, radio chip and the two A and B buttons.

Prototypes:

Below is my step by development of my Mighty Mike Glove.

Step 1:

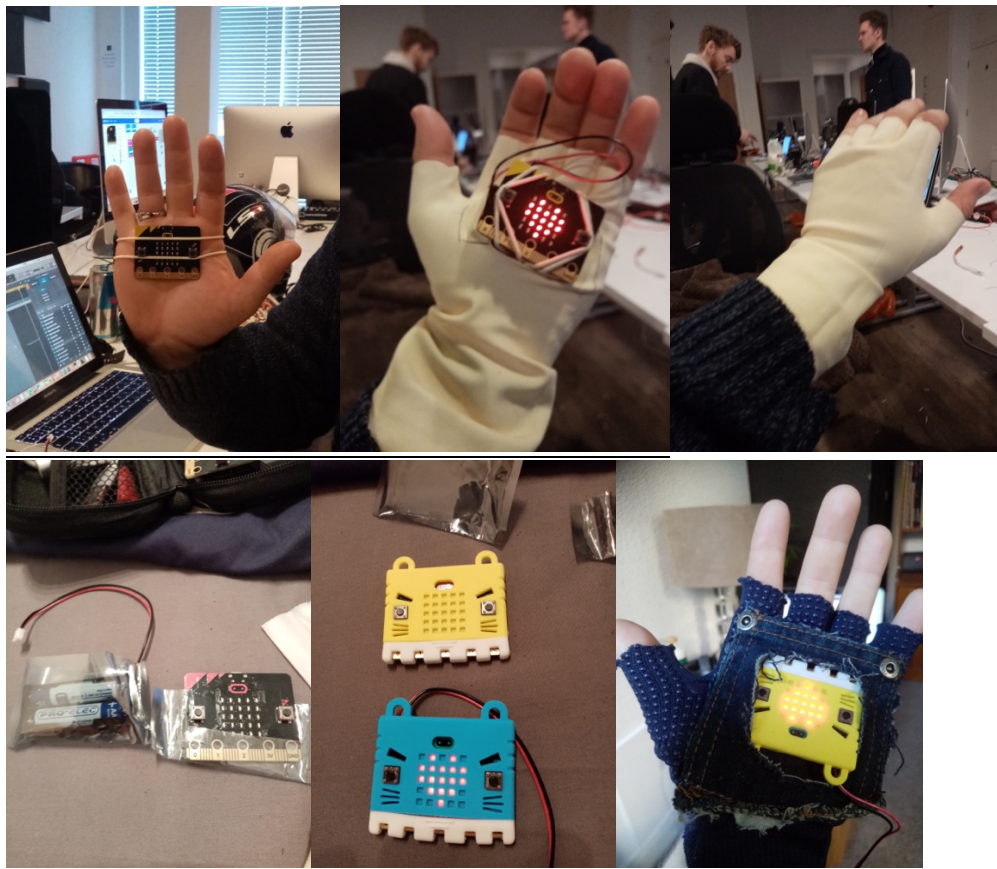
I started out by simply attaching the micro bit to my hand using elastic bands to see how the chip functioned and if it would function the way I desired and if I wanted to mount the chip in the centre of my palm or my knuckles.

Step 2:

Figuring out how to incorporate the micro bit into a glove and improve upon the attachment. I chose to use a rubber glove to start with as the material is cheap and easy to work with. I found the rubber held the micro bit and battery pack in place well. But the glove always split under a lot of movement as well as being very hot and uncomfortable after a short time which would render it unusable in a live situation.

Step 3:

Designing a pocket to hold the micro bit out of plastic wallets which worked great as they held the micro bit and battery pack well, but were not strong enough to hold the micro bit throughout quick movements and greater gestures I found the plastic pockets often tore or the micro bit would fall out.



Step 4:

I ordered two micro bit cases from amazon, as they firstly offer great protection of the micro bits and secondly allowed a way of attaching the chip to the glove in a save and stable way without deuterating when being used. The loops on the cases allow me to attach the micro bit into the glove by being attached to poppers inside the pocket to hold it securely in place through every gesture from being turned upside down to left or right and even free falling the pocket and poppers held up in all my beta testing.

Step 5:

This is the final prototype that I wish to take into production, I created a custom glove using an existing motorcycle inner glove, as the glove is made from a light weight and flexible material. I then removed the fingers and thumb to allow for greater flexibility and functionality of the micro bit so that the user can press the buttons and have greater control of the micro bit.

I created a denim pocket for the chip to sit in and a battery pocket inside the wrist to hold the battery pack.

Business Plan :

For my business Plan I am will be using the Canvas Model

“The Canvas is popular with entrepreneurs and intrapreneurs for business model innovation. Fundamentally, I find it delivers three things:

1. **Focus:** Stripping away the 40+ pages of ‘stuff’ in a traditional business plan, I’ve seen users of the BMC improve their clarify and focus on what’s driving the business (and what’s non-core and getting in the way).
2. **Flexibility:** It’s alot easier to tweak the model and try things (from a planning perspective) with something that’s sitting on a single page.

“Transparency: Your team will have a much easier time understanding your business model and be much more likely to buy in to your vision when it’s laid out on a single page.” (The 20 Minute Business Plan: Business Model Canvas Made Easy, 2020)

which breaks down into these nine separate elements:

1. Customer Segments Who are the customers? What do they think? See? Feel? Do?

My customers are professional musicians , musicians, DJ, Performers , students any one with an interest in music and technology,

2. Value Propositions: What’s compelling about the proposition? Why do customers buy, use?

It’s a cheap, time saving, makes music easier to make , and completely customisable to the users needs.

3. Channels: How are these propositions promoted, sold and delivered? Why? Is it working?

Online shop , website , music shops , schools, colleges , universities , festivals , gigs any musical outlet.

4. Customer Relationships: How do you interact with the customer through their ‘journey’?

From the sale to support with their product we will be every step out the way to insure the customer always has everything they need to be happy with the product from our online channels such as email , trouble shooting videos, telephone , email and all social

media. We will always be able to talk to the custom person to person to add the personal touch to our service.

5. Revenue Streams: How does the business earn revenue from the value propositions?

For physical sales of the product , tech support , online courses on how to use the product , licensing the product for use and celebrity endorsement, through education.

6. Key Activities: What *uniquely* strategic things does the business do to deliver its proposition?

Customisable, really great customer relations, affordable pricing,

7. Key Resources: What unique strategic assets must the business have to compete?

A website that stands out , active and engaging social media content , easy and useful helpful that is relatable and understandable

8. Key Partnerships: What can the company *not* do so it can focus on its Key Activities?

Distribute , manufacture , advertising , social media marketing , PR

9. Cost Structure: What are the business' major cost drivers? How are they linked to revenue?

Major costs : would be the creation and assembly of the product , distribution and promotion. This relates to the revenue as the cheaper it is to make the more money you can make from the revenue.

SWOT Analysis

Strengths :

Unique product that is affordable to all musicians from the professional to the entry level,

The chip is customisable in terms of what the user wishes to control in their DAW

The code for the micro Bit will be open source so that anyone can improve upon on it.

Anyone can code the micro bit using the micro bit website

It will cheap to buy as is being aimed at entry level musicians and performers

Completely wireless.

Weaknesses:

That the micro bit is rather basic and their better board available for use.

The look of the glove needs to be improved to meet current fashion trends.

Customers may find it hard to code which is why offer the micro bit already programmed.

Currently only one glove creating a limit to the amount of functions that are available

Need to find a better power than batteries , as battery life will become an issue

Opportunity

Use a more complex chip in the glove to make it more advance.

_Have two gloves instead of one to allow for up to 12 functions

Use a long USB lead instead of having batteries in the glove but this will take away the wireless functionality

Use WIFI or Blue tooth to communicate instead of short range radio waves.

Threat

Existing products on the market such as the Tornado A1 or MiMu gloves.

Current midi controllers and DJ controllers such as CDJ's , Hercules E2 controllers ,Native instruments launch pad could be competition

References :

Tech.microbit.org. 2020. *Hardware*. [online] Available at: <<https://tech.microbit.org/hardware/>> [Accessed 10 March 2020].

Alex Cowan. 2020. *The 20 Minute Business Plan: Business Model Canvas Made Easy*. [online] Available at: <https://www.alexandercowan.com/business-model-canvas-templates/#Step_1_of_10_Customer_Segments> [Accessed 20 March 2020].

Alex Cowan. 2020. *The 20 Minute Business Plan: Business Model Canvas Made Easy*. [online] Available at: <https://www.alexandercowan.com/business-model-canvas-templates/#Whatsquos_the_Business_Model_Canvas> [Accessed 20 March 2020].

Microsoft MakeCode for micro:bit. 2020. *Microsoft Makecode For Micro:Bit*. [online] Available at: <<https://makecode.microbit.org/#editor>> [Accessed 25 March 2020].

Cybersecuritymastersdegree.org. 2020. *A Brief History Of Hacker Culture*. [online] Available at: <<https://www.cybersecuritymastersdegree.org/a-brief-history-of-hacker-culture/>> [Accessed 26 March 2020]

Medium. 2020. *The Ten Commandments Of Hacker Culture*. [online] Available at: <<https://medium.com/@ememorato/the-ten-commandments-of-hacker-culture-4e183d570eb6>> [Accessed 26 March 2020].

Mimugloves.com. 2020. *MI·MU | Home*. [online] Available at: <<https://mimugloves.com/>> [Accessed 26 March 2020].

En.global-dj.com. 2020. *Global DJ | Premium Midi Gloves Controllers*. [online] Available at: <<https://en.global-dj.com/>> [Accessed 26 March 2020].

